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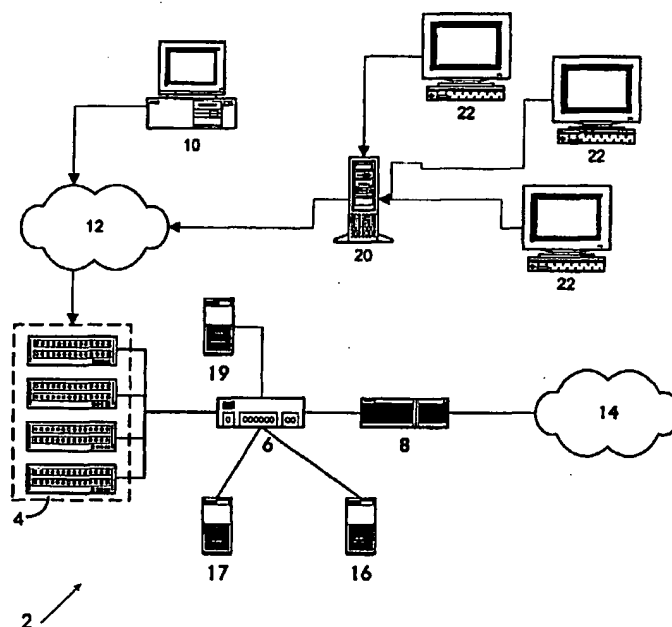
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(54) Title: AN ACCESS SYSTEM FOR USE WITH LANS



(57) Abstract: A method executed by an access system for enabling a client to access a communications network, the method including receiving an access request for a resource of the network, determining if the request includes a unique identifier for the client, removing the identifier and recording data related to the request using the identifier, when the request includes the identifier, and redirecting the request to instruct the client to store the identifier when the request omits the identifier.

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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

## AN ACCESS SYSTEM FOR USE WITH LANS

### Field of the Invention

5 The present invention relates to an access system that can be used to provide access to a communications network, such as the Internet, for users of Local Area Networks (LANs). In particular, the present invention relates to a method of tracking a user's behaviour on the Internet when the user is accessing the Internet using a single IP address assigned to a LAN server.

10

### Background of the Invention

The providers of access systems for the Internet, such as ISPs and web publishers, ideally wish to obtain as much information as possible on the preferences and desires of users of  
15 their systems and services in order to meet the service expectations and wishes of the users. For instance, an access system, as described in the specification of International Patent Application No. PCT/AU00/00418 ("the access system specification"), enables the connection state of users to be adjusted and their behaviour and accessed locations recorded, primarily on the basis of the IP address that is dynamically assigned to a user that  
20 connects to the access system. This is effective for users that connect to the access system individually. The users of local area networks, however, generally use a network server to connect to an ISP's access system and the LAN's server will be allocated one IP address for all of the network users of the LAN. This makes it impossible to discriminate between different users on the basis of the assigned IP address. Accordingly, it is desired to provide  
25 a system and method which alleviates the above difficulty or at least provides a useful alternative.

### Summary of the Invention

30 In accordance with the present invention there is provided a method executed by an access system for enabling a client to access a communications network, said method including:

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- receiving an access request for a resource of the network;  
determining if the request includes a unique identifier for the client;  
removing the identifier and recording data related to the request using the identifier,  
when the request includes the identifier; and  
5        redirecting the request to instruct the client to store the identifier when the request  
omits the identifier.

The present invention also provides an access system for enabling a client to access a  
communications network, including:

- 10        means for receiving an access request for a resource and determining when the  
request includes a unique identifier for the client;  
          means for removing the identifier and recording data related to the request based on  
the identifier; and  
          means for redirecting the request to instruct the client to store the identifier when  
15        the request omits the identifier.

The present invention also provides a network access system for executing:

- (a)     if a TCP/IP request from a client includes an identifier associated with the  
access system, the identifier is removed from the request and the request is sent;  
20        (b)     else if the request has a first key associated with the access system, the first  
key is removed, the request is sent, and data added to the response to the request to set an  
identifier in the client with a second key associated with the access system, for the domain  
of the request; and  
          (c)     else the client is directed to a server of the access system that returns a  
25        response to the client to set an identifier with a third key associated with the access system,  
for the domain of the server.

#### **Brief Description of the Drawings**

- 30        A preferred embodiment of the present invention is hereinafter described, by way of  
example only, with reference to the accompanying drawings wherein:

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Figure 1 is a block diagram of a preferred embodiment of an access system connected to the Internet and a telecommunications network;

Figure 2 is a message flow diagram for a process executed by the system for initial authentication;

5        Figure 3 is a message flow diagram of a process executed by the system when accessing a new location; and

Figure 4 is a message flow diagram of a process executed by the system when accessing a previously accessed location

#### 10    **Detailed Description of Preferred Embodiments of the Invention**

An access system 2, as shown in Figure 1, includes a plurality of remote access servers (RASs) 4, a traffic switch 6, a proxy server 16, a local web server 17, a database server 19, and a router 8 that connects to a public communications network, such as the Internet 14.

15    The RASs allow the computers 10 of remote users to dial into the system 2 using the lines provided by a standard telecommunications network 12 and connect to the input ports of the RASs 4, respectively. On connection to a port of a RAS 4, the RAS 4 and the user's computer 10 establish a unique session and IP traffic for that session is switched by the switch 6 so that it is controlled by the proxy server 16. Similarly a LAN server 20, which

20    may comprise a Network Address Translation (NAT) server or a proxy server, is connected to a port of a RAS 4, and this may be a permanent connection over the network 12. The LAN server 20 is assigned a single IP address for all TCP/IP traffic handled by the system 2, and there may be several thousand individual computers 22 for respective users connected using the server 20. All the components of the access system 2 may be

25    standard components used by an ISP. Alternatively, the access system 2 may be the access system described in the access system specification. The system however is configured, and in particular the proxy server 16, switch 6 and web server 17 are configured, to include logic to execute the messaging process described below to track individual clients 22 behind a LAN server 20. The logic may be provided by software code and/or hardware

30    circuits to execute the messaging process, and as will be understood by those skilled in the art, the components of the logic may be distributed over a communications network.

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When a client 22 initially enters a request for a particular location on the Internet 14, such as a Yahoo web server, the request including the Universal Resource Locator (URL) for the location is received by the proxy 16, at step 30, as shown in Figure 2. The proxy 16 will then send back, initially, to the client browser a 302 redirect URL for the web server 17, as shown in step 32, that includes the domain of the requested server, ie the URL of the requested page. This causes the browser at step 34 to issue a request including the URL for the web server 17 with the original requested domain. This is passed by the proxy 16 to the web server 17 of the access system, which issues, at step 35, a 302 redirect to initiate the access system authentication process because the request omits a recognised access system identifying key, as described below. The 302 redirect includes a URL to redirect the client 22 to a login page for the access system. This causes the client to issue a GET http request for the login page at step 36. This is passed by the proxy 16 to obtain the login page, which may be served from the access system web server 17, at step 37. The web server 17 returns a login display page via the proxy server 16, at step 36 for display on the client's browser. The user then completes a form on the login page which is posted at step 38 via the proxy 16 to the server 17. The server 17 then responds at step 40 with a 200 message, after validating the login of the user, with a set cookie message for the client's browser that refers to the domain of the server 17 and contains a unique key, being a unique ASCII character string, for the client machine 22. This creates a cookie file or entry on the client machine 22 that enables the user to be tracked subsequently, as described below, and all their browsing activity recorded without any other servers on the Internet being aware that the cookie is present. The cookie, as described below, also only exists during the client's browser session on the access system.

After authentication, when a user wishes to go to a new site, as shown in Figure 3, such as a Yahoo server on the Internet 14, the client will send a request with a URL for the site, at step 50. This request does not include any information from the cookie as it is a request for a different domain than the domain of the web server 17. The proxy 16 on receiving the request determines that the access system cookie information is not included, and therefore returns to the client 22 a 302 redirect URL for the web server 17 with the URL or

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domain of the requested site, at step 52. This again causes a redirect to the web server 17, but this time the cookie and unique key are returned to the server 17 with the URL for the server 17, at step 54. The server 17 in response returns a 302 redirect URL that includes the original http request, and a temporary key for the client machine 22, at step 56, as  
5 shown in Figure 3. A temporary key is used at this stage, instead of the unique key, as the key is visible on most browsers by virtue of the fact that it has been included in the URL for this part of the messaging process. The unique key is temporarily stored on the web server 17 and/or proxy 16 against the random temporary key that has been allocated for the client machine. The 302 redirect of step 56 is sent back to the client 22 via the proxy 16,  
10 and the client responds by forwarding a GET http request for the requested site that includes the temporary key in the URL identifying the client 22, at step 57. The GET request is received by the proxy 16, the key stripped from the URL and a record made of the location requested by the client. This is recorded in the database server 19 against the unique key for the client machine 22. The stripped request is then forwarded as a standard  
15 http GET request, at step 58 from the proxy 16 out onto the Internet 14 to the requested server, in this instance the requested Yahoo server. The Yahoo requested page is then returned from the Yahoo server, at step 60, and this is received via the proxy 16. The proxy 16 then adds a set cookie message, as shown in Figure 3 at step 62, to return to the client machine with the Yahoo page. The set cookie message includes the requested domain and  
20 the unique key for the client 22. The cookie message ensures that a cookie is established for the requested, ie Yahoo, domain with the unique key used by the access system 2.

Accordingly, when a client 22 requests a page from a previously accessed domain, as shown in Figure 4, the client will send a request at step 70 that includes the cookie for the  
25 domain with the unique key for the access system 2. The proxy 16 accesses the cookie and records the requested page in the database 19 against the unique key for the client 22. The cookie is stripped from the request by the proxy 16 and the request then forwarded onto the requested server on the Internet 14, at step 72. The server will then simply return the requested page, at step 74 via the proxy 16 to the client 22.

30

The messaging process which is executed by the proxy 16 can be represented by the

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following if the web server 17 has the domain "fol.com":

If the client request has the access system cookie or the request is to the fol.com domain

remove the cookie from the request if it exists

5 record the requested page against the key of the cookie if it exists  
get the requested page

else if the request has an access system key in the URL

remove the key

record the requested page using the key

10 fetch the page

add a set-cookie header to the page with the access system key

else

redirect the client to [http://fol.com/check? URL=requested\\_page](http://fol.com/check? URL=requested_page).

15 An alternative, and in a number respects more efficient implementation, is for all of the steps executed by the web server 17 to be executed by the proxy server 16. This involves the proxy 16 acting as the web server for the fol.com domain that sets the identifying keys.

Many modifications will be apparent to those skilled in the art without departing from the  
20 scope of the present invention as herein described with reference to the accompanying drawings.



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## CLAIMS:

1. A method executed by an access system for enabling a client to access a communications network, said method including:  
5 receiving an access request for a resource of the network;  
determining if the request includes a unique identifier for the client;  
removing the identifier and recording data related to the request using the identifier, when the request includes the identifier; and  
redirecting the request to instruct the client to store the identifier when the request  
10 omits the identifier.
2. A method executed by an access system as claimed in claim 1, wherein said redirecting includes sending a redirect instruction with at least part of the request to redirect the client to a server of the access system, and sending an instruction from the  
15 server to cause the client to store the identifier.
3. A method as claimed in claim 2, wherein said redirecting includes executing an authentication process with said client before sending said instruction when a response to said redirect instruction omits said identifier.  
20
4. A method as claimed in claim 2, wherein said redirecting includes sending a further redirect instruction with a temporary identifier and at least part of the request to redirect said client to the resource of said request, when a response to said redirect instruction includes said identifier.  
25
5. A method as claimed in claim 4, wherein said temporary identifier is recorded against said identifier, is returned with a response to said further redirect instruction, and is used to access said identifier for storing said data related to the request.
- 30 6. A method as claimed in claim 6, wherein said temporary identifier is returned in a resource locator for said resource.

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7. A method as claimed in claim 2, wherein said identifier is a cookie key and said instruction is a set cookie instruction.
- 5 8. A method as claimed in claim 5, wherein said identifier is a cookie key and said instruction is a set cookie instruction returned with said resource and a domain of said resource.
9. A method as claimed in claim 3, wherein said identifier is a cookie key and said  
10 instruction is set cookie instruction returned after said authentication process and for a domain of said server.
10. A method as claimed in any one of the preceding claims, wherein said request is a TCP/IP request.
- 15 11. An access system having components for executing the steps of a method as claimed in any one of the preceding claims.
12. An access system as claimed in claim 11, wherein the components are of an  
20 Internet service provider.
13. Computer program code on computer readable storage media for executing the steps of a method as claimed in any one of claims 1 to 10.
- 25 14. An access system for enabling a client to access a communications network, including:  
means for receiving an access request for a resource and determining when the request includes a unique identifier for the client;  
means for removing the identifier and recording data related to the request based on  
30 the identifier; and  
means for redirecting the request to instruct the client to store the identifier when

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the request omits the identifier.

15. A network access system for executing:

(a) if a TCP/IP request from a client includes an identifier associated with the  
5 access system, the identifier is removed from the request and the request is sent;

(b) else if the request has a first key associated with the access system, the first  
key is removed, the request is sent, and data added to the response to the request to set an  
identifier in the client with a second key associated with the access system, for the domain  
of the request; and

10 (c) else the client is directed to a server of the access system that returns a  
response to the client to set an identifier with a third key associated with the access system,  
for the domain of the server.

16. A network access system as claimed in claim 15, wherein data for said request is  
15 recorded using said identifier when executing step (a).

17. A network access system as claimed in claim 15, wherein data for said request is  
recorded using said first key when executing step (a).

20 18. A network access system as claimed in claim 5, wherein said first key is temporary  
data included in a resource locator of the request.

19. A network access system as claimed in claim 15, wherein said second key is the  
same as said third key.

25

20. A network access system as claimed in claim 15 or 19, wherein said identifier is a  
cookie.

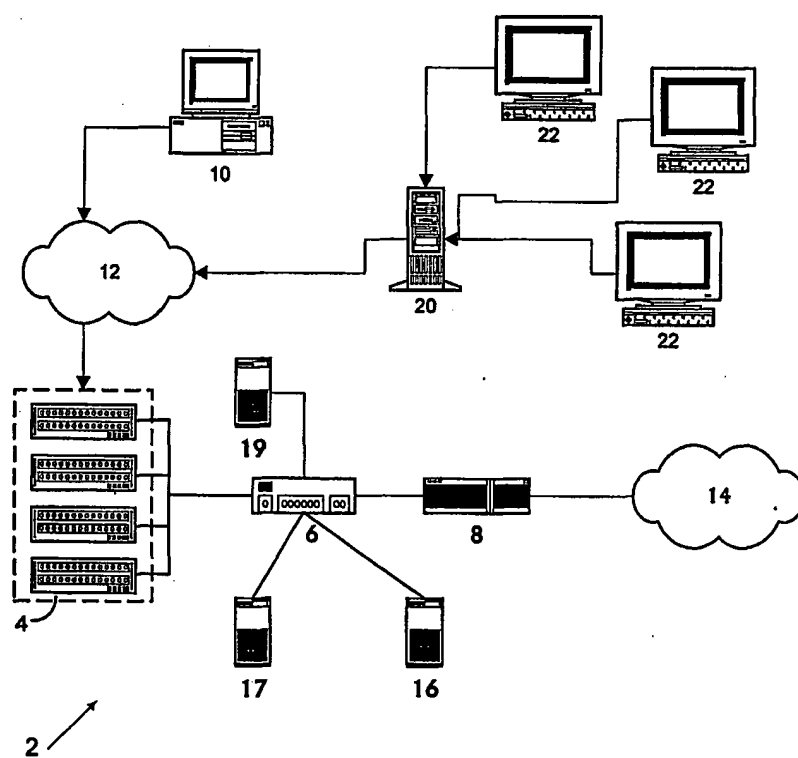


Figure 1

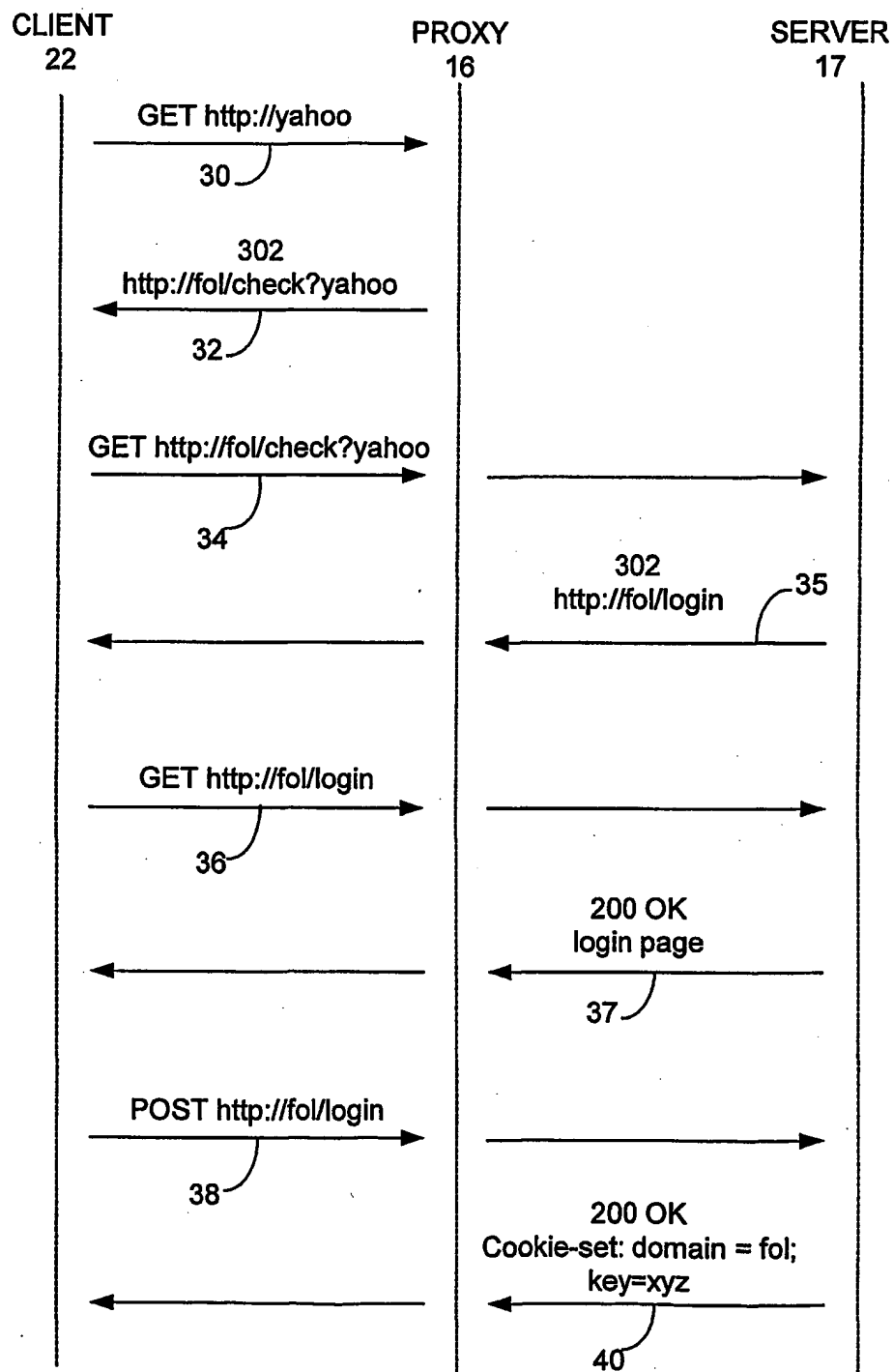


Figure 2

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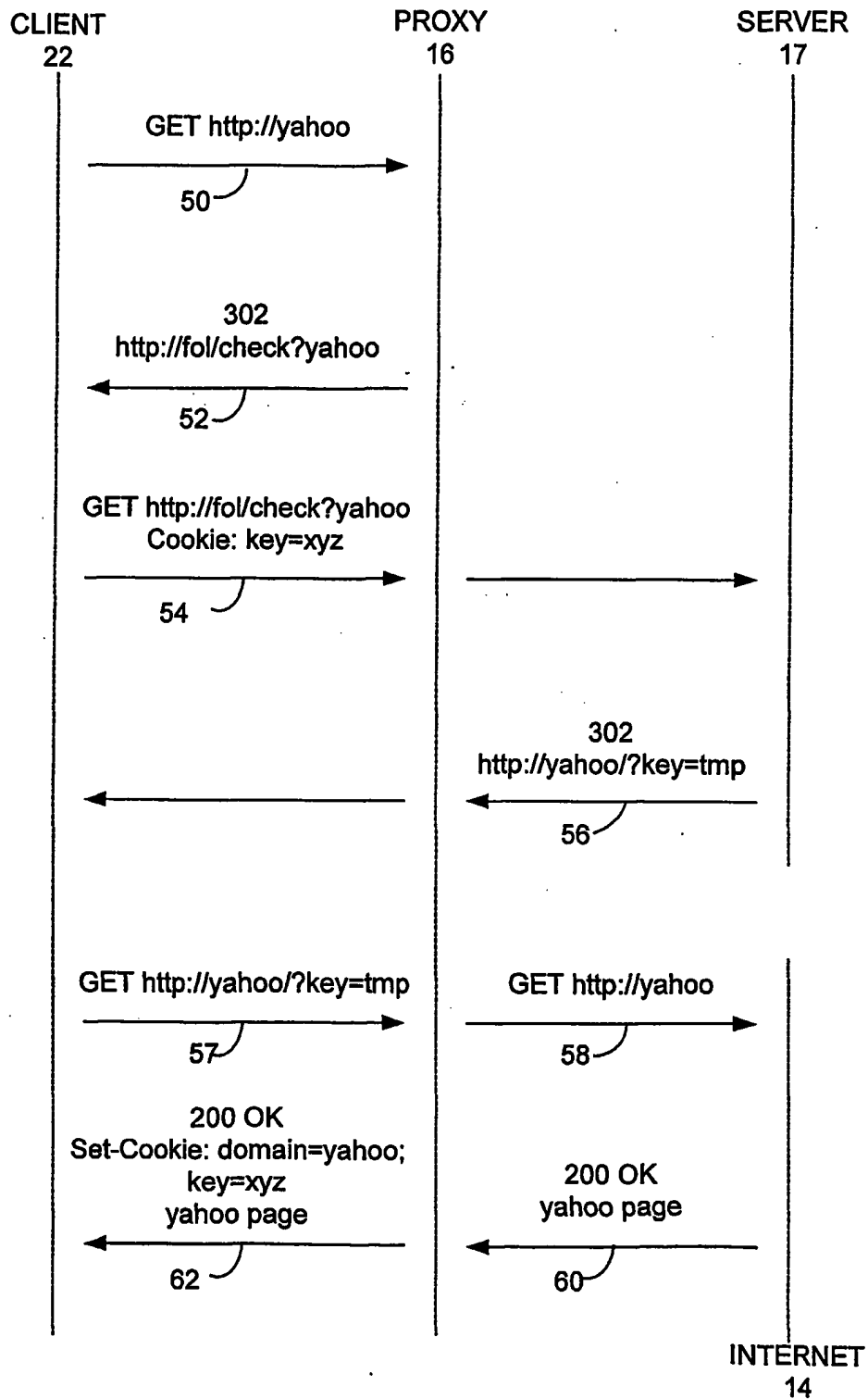


Figure 3

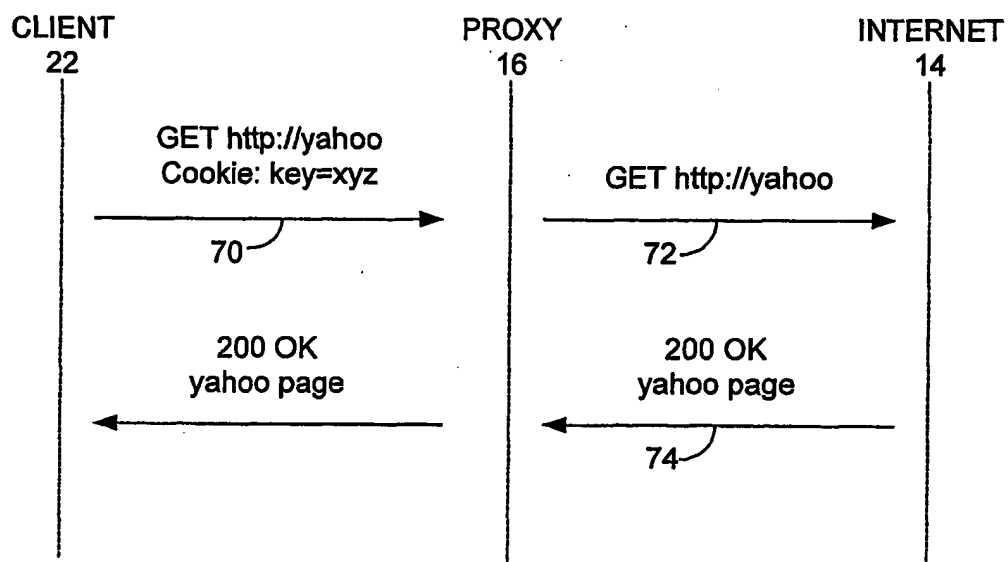


Figure 4

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU01/00962

**A. CLASSIFICATION OF SUBJECT MATTER**Int. Cl. <sup>7</sup>: G06F 13/14

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

AU: IPC AS ABOVE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPAT, INSPEC: LAN, network, internet, www, local area, browser, netscape, URL, address, access, identifier, cookie, login, key, client, user, request

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6088805 A (Davis et al.) 11 July 2000 See whole document	1, 14, 15
A	WO 99/23568 A (Juno Online Services, L.P.) 14 May 1999 See page 6 line 25 - page 7 line 31	1, 14, 15
A	WO 98/59481 A (Inforonics, Inc.) 30 December 1998 See page 2 line 21 - page 5 line 8	1 - 20
A	EP 844767 A (NCR International Inc.) 27 May 1998 See whole document	1 - 20

☐ Further documents are listed in the continuation of Box C
 ☒ See patent family annex

* Special categories of cited documents:	
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

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Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustalia.gov.au Facsimile No. (02) 6285 3929	Authorized officer  CATHERINE REES Telephone No : (02) 6283 2811



**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

International application No.  
**PCT/AU01/00962**

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report			Patent Family Member			
US	6088805	NONE				
WO	99/23568	AU 11953/99	EP	1034481		
WO	98/59481	AU 81664/98	BR	9810938	EP	981885
		US 5999971				
EP	844767	JP 10303977	US	5848412		
						END OF ANNEX